28

CLINICAL LECTURE

ON THE

EARLY HISTORY OF CALCULOUS DISEASE,

AND THE TREATMENT BEST ADAPTED FOR ITS PREVENTION,

Delivered in University College Hospital, in May, 1871,

BY SIR HENRY THOMPSON, F.R.C.S., &c. &c.

From "THE LANCET," of January 13th, 1872.

GENTLEMEN,—We have recently studied together and discussed very fully the various operations which are practised for the removal of stone from the bladder, and you have had the opportunity of seeing them performed many times, not less than eleven cases having passed through my ward in a few weeks, each one with a successful result.

But, satisfactory as all this is, it suggests to my mind very strongly that there remains an important question for us to consider; as important, indeed, as any of the preceding, and one which must naturally arise in all thinking minds. It is this: Is there not a period anterior to the stage of the malady already examined —a time at which we might prevent the formation of stone in the bladder, and so get rid of the necessity for removing it? Admirable as the results of operative means have been—perfect (one may almost say) as they have become, at all events so far as regards the crushing operation—great as is the triumph which surgery has achieved in removing stone from the bladder—I take it there are very few men indeed who would desire, if they could help it, to exhibit that triumph in their own persons; all would be infinitely better pleased if the formation of stone were prevented, rather than removed, however cleverly you may perform the operation. This, then, leads me to the consideration of an important question,—Can we do anything to prevent the formation of stone in the urinary passages? It is, in fact, the early stage of this malady that will be the subject of our lecture to-day.

I commence by saying that I think a great deal may be done. But at the outset of the inquiry we naturally ask, What is the kind of stone (for there are several kinds) the formation of which we may hope to do most in preventing? All calculi are of local or of constitutional origin. By "local" I mean formed by disease in the bladder, and not depending upon any constitutional conditions; by "constitutional" I mean formed by some vice in the system. Now, the large majority of stones are of constitutional, and not of local origin. When they are local you know that you cannot prevent their formation except by mechanical means. Calculous matter, the elements of which are produced in the bladder itself, may be washed out, or may be broken and then washed out. But when stones are of constitutional origin—and those are what we are going to refer to entirely to-day—the elements are separated from the blood, and no mechanical means of prevention can be thought of for an instant. Now, from observation we know that nineteen out of twenty of such stones have uric acid for their basis, the remaining one in twenty being oxalate of lime;* and, less commonly still, there are phosphatic stones, which are of constitutional origin also. Therefore, practically, to all intents and purposes the problem before us is how to prevent the formation of uric-acid calculus.

Let us examine the early history of a case of persisting uric-acid deposit. First of all, let me say, going back to the root of the matter, that it is generally more or less hereditary. As a single illustration of this, we have just seen a case of uric-acid calculus in the ward, and learned that his father had "gravel or stone for the last twenty years of his life." And my almost invariable experience is, that either calculus or gout, most commonly the latter, has been observed in the family of the patient who comes to me with one of these formations in his bladder. I believe it, then, to be very strongly hereditary. We speak of tubercular disease and of cancer as being transmitted by blood relations, especially the former; but I do not think even it is more certainly hereditary than the disposition to uric-acid deposits in one form or another. I make a point of asking the question of all patients who come to me with this complaint; and although I cannot at present furnish you with an exact numerical statement, I do know that in a very large majority, gravel or gout (for I wish to show you the identity as to the origin of the two complaints) has existed in the preceding generation; indeed, it is rare to find it otherwise. This hereditary tendency varies in force or strength in different families. You will find some persons with persisting uric-acid deposits at thirty years of age, others at forty, others at sixty. Of course, the earlier the time at which it appears, the stronger you will find the hereditary disposition, and the more obstinate, probably, will be its tendency to persist.

---

* The deposits of oxalate of lime and of uric acid so often replace each other that the consideration of the latter becomes practically generally sufficient for our purpose.

What, then, are the first signs of this condition in the patient? Usually, the first sign is that the urine deposits pinkish matter, on cooling at the bottom of the vessel, or the secretion may be merely cloudy when cold. It is passed quite clear, becoming cloudy only when it acquires the ordinary surrounding temperature. This phenomenon, therefore, may appear more frequently in winter than in summer, because the external temperature is lower. It is simply a deposit of salts from a hot solution as the liquid grows cooler, all being easily dissolved by raising the temperature of the liquid to that at which it was originally passed. This is a condition of urine which very often and very unnecessarily excites much anxiety on the part of patients, and only the persistence of which can be looked upon as a sign of what is called "the uric-acid diathesis." Mind, I mean strictly persistence, or at all events frequency of occurrence; for you or I, with no hereditary predisposition, may take a little more beer than usual, or an extra glass of champagne, or a glass or two of unaccustomed port, and find next morning a considerable quantity of this pinkish deposit, the urine looking almost like pea-soup, but not so thick; and when the vessel is tilted on one side a tidal mark, so to speak, is seen, showing the height at which the liquid stood: all this, as I said before, being redissolved by heat. But if, without any errors of diet, of which any but a very small allowance of alcoholic drink is only one, a patient habitually passes this kind of urine—if in time there is a frequent deposit of uric-acid manifested by the presence of little crystals looking like particles of cayenne pepper at the bottom of the vessel—when this occurs rather early in life, say before forty there is not much doubt that there is a strong tendency to produce uric acid, either inherited or acquired. For this tendency may to a certain extent be acquired, or a pre-existing habit may be intensified; but, as I have before said, it is almost always inherited.

We have followed the complaint up to the formation of cayenne-pepper crystals. I now show you a specimen of urine quite cloudy with lithates, although you must be familiar with it in the wards, and how on heating the liquid it again becomes clear and that in a short time, while we are talking, it again becomes cloudy on cooling. Let me once more remind you that this may happen with the most healthy individual; and it is only the persistence of the symptom, without errors of diet, which would lead you to suspect a condition that requires treatment. Of the cayenne-pepper deposit I have some very good specimens here, which have been collected from patients who passed it habitually. These consist mainly of the transparen rhomboidal uric-acid crystals, which you know to be very beautiful objects under the microscope. They may be passed almost daily and habitually, or only every month or six weeks, in large quantities, when they usually produce some irritation At such periods the patient may experience pains in the back and great discomfort and be then said to have an attack of sand or gravel. These attacks may occur a varying intervals, and usually become more frequent or severe, unless the patien does something to prevent the formation. Afterwards he passes tiny calculi commonly called "gravel," which seem to be rounded aggregations of the sam crystals; and these little bodies tend in time to become larger, sometimes as larg as small peas, or even beans; and they are still specimens of the same product—that is, of uric acid, associated more or less with some base, such as soda, o ammonia.

Now let me recall for one moment what I said as to the relation of gout to thi condition. I have frequently seen these two complaints alternating, comparing one generation with another: gout appearing in one, gravel in the second, and the gout in the third. But the same individual may also have alternating attacks o gout and gravel. I have seen a patient suffering for years from gout, which cease for several months, when he developed for the first time a uric-acid stone. Lastly the so-called "chalk-stone," which you have often seen infesting the knuckles an disfiguring the hands of elderly people in advanced stages of gout, are compose of the same material—that is, of uric acid, usually as urate of soda. The identit of the two things, then, is unquestionable; they constitute two different series of phenomena, but both spring from the same root.

Now what is to be done for these cases? What mode of treatment will help to prevent the arrival of at least the advanced condition—namely, that of calculus too large to be voided by the patient? Generally speaking, I think we see such patients in a tolerably early stage, although this is by no means always the case. Some are much alarmed at a very early period, when the urine is only occasionally thick with urates. You will of course disabuse such patients of their false impressions, because numbers of persons mistake such thick urine for highly organised matter. I have known persons to become almost hypochondriac through not knowing that such deposits are of little consequence at first, and can be easily treated. But what are we to do for those who habitually pass the cayenne-pepper crystals of uric acid or small calculi? You will first seek the patient's antecedents, and learn all he has to tell you of his habits, his diet, and his family history; and your mode of treatment will be determined accordingly. First of all, let me speak of the general principles upon which the treatment should be conducted. A very simple rule—indeed, too simple, I think—is often adopted. When the urine has persistently and habitually thrown down acid deposits, the patient has generally been prescribed alkalies; if, on the contrary, he has had alkaline deposits, he has been treated with acids. That simple mode has too often formed the main portion of the treatment. In the former case he has soda or potash largely administered, or he will be told to drink so many glasses of Vichy water, which is mainly a strong solution of carbonate of soda, only a natural instead of an artificial one. Now it is quite true that with alkalies, provided enough be taken, these deposits will disappear: the uric-acid will no longer be deposited; the urine will become less irritating; the annoying symptoms will be diminished or got rid of. And of course the patient is very much pleased with this new condition of clear urine and disappearance of all deposit. And you will say, "What more can be desired?" This: you have merely made his enemy disappear, but he is by no means rid of its presence; you have not checked the acid formation. The uric acid is there as ever; but the uric acid and the urates are soluble in alkali, and you have only made them invisible. You really have the same condition as that of the fabled ostrich, which is said to put its head in the bush when pursued by hunters, and, no longer seeing them, believes itself secure. Just such is the security of the patient with uric acid who trusts solely to alkalies or Vichy water. His surplus deposits have become imperceptible to *his* vision; nothing more. I do not say that the alkalies have been absolutely unserviceable as regarding his constitutional state, but they will not improve it to any great extent; and when he leaves them off the acid shows itself again. Diuretics must be regarded in the same light. In those cases which are treated with diuretics, he secretion of water is no doubt increased *quoad* the amount of solids, and the olids are thus dissolved. In both instances what you have chiefly done has been o stimulate the kidneys, already overworked, to do more. You have by no means ured the patient.

Now let us ask what is the real pathology of these cases, and then I think I shall e able to show you a more efficient remedy. The problem has presented itself to me with great force and frequency, because people, naturally fearing they may rrive at the stage of calculous formations, come for advice in the earliest stages, nd with the strongest desire to avoid the advanced one of stone in the bladder. o far from sending them to Vichy or giving them alkalies, I believe they can be e more effectually dealt with by a different mode of treatment. Let me premise, n broad and simple terms—as our time here, and, I may perhaps add, the extent f our knowledge, will not permit me to be more minute or exact in detail—that he origin of what we call gouty symptoms, as well as of a superabundant uric-acid eposit in the urine, is due to defective assimilation on the part of organs associated ith or forming the primæ viæ. I am quite aware that it is common in practice to peak somewhat knowingly of the liver, its actions and its states, although we have ill a good deal to learn about all this. Some years ago we talked and acted as if e were thoroughly acquainted with the liver and its functions; but during the ast fifteen or twenty years new light has been thrown upon the subject by Bernard, avy, and other workers in the same field, and we have learned that the more we cquired the less did we certainly know of its natural functions, still less of its tion in disease. Thus, if one thing was more settled than another, at least since he time of Abernethy, it was that mercury had a specific influence on that organ; ut now we find there are grounds for believing that the action supposed has no xistence at all. There were other things, indeed, which were vaunted to take the place of it, but no one ever thought of disputing the fact that you could augment the bile secretion by administering mercury. I am not here to say whether that is so or not, but it seems to have been proved that there are substantial reasons for doubting if our ancient faith in that dogma be tenable. In speaking, then, of the "defective action of the liver," or of "torpor of the liver," I merely use provisional terms, which most understand as indicating more or less distinctly a certain set of symptoms. Let them be briefly described as mainly consisting of a constant, or almost constant, deficient excreting function by the bowels, sometimes, but by no means always, associated with impaired appetite and slow or uneasy digestion; these latter being often absent if the diet is carefully selected, or if the patient lives in the open air and takes much exercise. On the other hand, considerable and multiform symptoms of disturbed digestion may be frequently present. I cannot positively state whether those phenomena are really due to inactivity of the organ in question; practically, for us to-day, this does not signify much, but the current terms are still convenient formularies until others can be substituted for describing the condition in question.

Now, at the bottom of this tendency to uric-acid production there often lies what is thus understood as inactivity of the liver; and the true rationale of the undue formation of the urinary salts appears to be that, the liver or some allied organ not doing its duty as an excreting organ, the kidneys have more work thrown upon them. Thus the solid matters of the urine, or rather some of its ordinary constituents, are augmented—not all of them, for urea is not necessarily increased, but uric acid is largely produced, and is eliminated not only in solution but in crystalline forms. Uric acid is very insoluble in water; and although the quantity thrown out may be quite soluble at the natural temperature of the urine (100 deg. Fahr.), when this diminishes to 60, 50, or 40 deg., the acid is deposited; and when the quantity is still larger, even the ordinary amount of fluid associated with it at a temperature of 100 deg. will not suffice to dissolve the whole, and solid uric acid is deposited in some part of the urinary passages. This deposit may take place in the kidneys themselves, giving rise, if not thrown off, to the formation of calculus, at first renal, but sooner or later mostly becoming vesical. Now, if all this be so, the formation of uric-acid gravel is not by any means to be regarded as necessarily disease of the kidney; on the contrary, it is the result of an active and capable organ vicariously relieving some other organ which is torpid. The true remedy, therefore is, not to stimulate the kidneys, already overworked—not, to use a familiar simile, to spur that horse of the team which is already doing too much work—but you are to seek the cause in that other one of the team which is doing deficient work, and that is almost invariably the liver, in the sense already explained.

The treatment, then, which I advise you to pursue, is to employ such agents as will stimulate the excretory action by the primæ viæ without depressing vital power. No doubt that a wonderful agent for the purpose is mercury; and it is quite unquestionable that the relief of the symptoms above alluded to is to be obtained in a remarkable manner by occasional small doses of that drug. For our purpose, however, it is neither so successful in action, neither can it be considered so harmless, as another class of agents, which in these cases I believe to be in every way superior —I mean certain kinds of natural mineral waters. These I also regard as superior in these maladies, to taraxacum, nitric acid, alkalies, and the other substitutes, as they have been termed, for mercurial remedies, in promoting the function of the liver. The mineral waters which I refer to belong to a group of springs, all containing sulphate of soda, and some of them sulphate of magnesia also, in solution. In studying these waters, I wish you to look with me at the composition of them, and at the same time to dismiss from your minds entirely those views of medicinal doses which you have acquired in the dispensary, and which necessarily belong to it, since small quantities of drugs, as they exist in mineral waters, will act more freely than will those quantities combined after the ordinary pharmaceutical method. You ask me for a demonstration, and I am quite ready to give it you. At the same time let me caution you against regarding the small doses of mineral waters as having any affinity, either in the matter of quantity, or by manner of administration, with what is understood as homœopathic doses. Thus, for example, you know that you may give A an ounce of salts, or B half an ounce, and you purge them; but you may obtain the same effect with one-fifth of those quantities if you give it as prepared in Nature's laboratory in the form of mineral water. It is a curious fact, which I give as an ultimate one, and without speculating here on the cause of the difference. As a proof of the superior force of the saline combinations found in natural springs, I may refer you to the following experiment. If you will reduce by careful evaporation, as I have done, such mineral waters to their pharmaceutical condition of crystallised salts, you will find them possessing little if any more power than similar salts as obtained by the ordinary processes, and met with in every chemist's shop. They no longer do their work on the same terms as when administered in the original water before they were separated by evaporation. You will therefore readily understand how essential to our end it is to employ the natural mineral waters; since what are called "artificial waters," however admirably prepared, are simply pharmaceutical products, and are destitute of the very quality which distinguishes the remedies they are designed to imitate.

Here is a table of the waters which I refer to, with a comparative synopsis of their distinguishing saline contents, representing the number of grains (without chloride of sodium and other less active agents) in an English pint. Below these I add two well-known alkaline waters.

	Sulphate of Soda.	Sulphate of Magnesia.	Carbonate of Soda.	
Saline—				
Pullna..............	154 grs.	116 grs.	—	
Friedrichshalle......	51 ,,	49 ,,	—	
Marienbad (Kreuz) ..	48 ,,	—	9 grs.	Little iron.
Carlsbad (Sprudel) ..	25 ,,	—	13 ,,	
Franzensbad........	30 ,,	—	6 ,,	Little iron
Alkaline—				
Vichy (Celestins) about	3 ,,	—	47 ,,	Little iron.
Vals (Magdeleine) about	—	—	65 ,,	Little iron.

The most powerful of this group is that of Pullna, which contains 154 grains, or nearly $2\frac{1}{2}$ drachms, of sulphate of soda to the English pint, and nearly 2 drachms of sulphate of magnesia. Those quantities would give a tolerably efficient purge to anybody. But you must not give a pint of Pullna; five ounces would be a full dose. I do not like Pullna generally for our purpose, because it purges too freely, often gripes, and is very nauseous. Half a drachm of sulphate of soda, and half a drachm of sulphate of magnesia in this form is too much for many people. I therefore recommend Friedrichshalle, which contains not a drachm of sulphate of soda in a pint, and little more than three quarters of a drachm of sulphate of magnesia. Nevertheless, you would not think of giving a pint; eight or nine ounces make an efficient purge; for many persons six or seven suffice. I think I may say that seven ounces is an ordinary average dose. If you take seven ounces of Friedrichshalle water an hour before breakfast, and soon after a cup of hot tea or coffee, you will have a full, free action of the bowels; perhaps two. That, you see, would be about twenty-five grains of sulphate of soda and twenty grains of sulphate of magnesia, which, taken in any combination you like out of a druggist's drawer, would have no appreciable action; you might be a little uncomfortable, perhaps, but there would be no action of the bowels. To repeat what I have said: if you evaporate a quantity of Friedrichshalle water in a warm water bath, and obtain as perfect a product as a chemist can produce, and administer four times the amount of salt in that form which exists in a dose of the natural water, you would still not have such efficient or such certain results as from the small quantity (in the natural water) named above. So that there is something, which I do not pretend to explain, and certainly shall not speculate about here, which distinguishes the action of mineral waters from the action of salts which are produced pharmaceutically. The next water on my list is Marienbad, which contains no sulphate of magnesia, forty-eight grains of sulphate of soda in the pint, with nine grains of carbonate of soda, and a small quantity of iron. About half a pint produces for most persons an easy motion. If this water is exposed to the air for a day or two there will be an obvious brown deposit of the iron, and it may be regarded as slightly ferruginous, though that is a secondary character. The next is Carlsbad, with its many springs, all of which contain about twenty grains of sulphate of soda, and thirteen of carbonate of soda in the pint. Then we come to Franzensbad, which contains thirty grains of sulphate of soda, six of carbonate, and a little iron, which Carlsbad does not. That closes this group of springs.

But now I shall just point out the distinctive characters of the alkaline waters which are so popular in this country. First, Vichy, which contains only three grains of sulphate of soda, but nearly fifty grains of carbonate of soda, in the pint

—a powerful solution. Then we come to Vals, which is also from the volcanic district of France, some of the springs of which contain upwards of sixty grains of carbonate of soda, and nothing else worth mentioning. These two waters are extremely famous, and are much resorted to against gout and gravel. Under their use the uric-acid deposits disappear—that is, they are dissolved by the alkali. Inasmuch also as this appears to have some beneficial action on the liver, a certain degree of permanent benefit is perhaps also attained. Thus such patients are often better for a time after a visit to Vichy; but, as a rule, are not permanently benefited. I am satisfied, after observation on the spot, and on the effect of the waters here, that they only temporarily mitigate the complaint, and do not cure it. Now, the principle upon which the waters of Friedrichshalle and Carlsbad are beneficial is, that they produce activity in all the digestive functions, and thus waste matters which have hitherto been thrown out as uric acid by the kidneys are eliminated in some other form. And thus it is that, if it be necessary to send these patients abroad, I prefer very much Carlsbad to Vichy, provided always that the subject of a Carlsbad course must not have become too weak, as for a time it makes a demand on the strength not well supported by a feeble person. Generally, however, this is not at all the condition of those who are passing uric-acid gravel. Happily, also, for most people, our purpose can be attained as well at home. I believe that a short course of Friedrichshalle first, followed by Carlsbad, or by a combination of the two, produces the best results in these cases. This method has, at all events, been more successful with me than any other. Such a course should be continued, according to circumstances, for six or eight weeks.

A few words on the way in which you should give them. If you have a patient coming to you whose digestion is not good, complaining of foul tongue, with deranged digestion and loss of appetite, it is sometimes, not always, desirable to give first a single dose—no more, say three or four grains—of blue pill at night, and the next morning eight or ten ounces of Friedrichshalle water, so as to ensure good action at first. Then commence with Friedrichshalle combined with hot water, one dose every morning an hour before breakfast, diminishing a little the quantity every day or every few days. One of the characteristics of this water is that the longer it is taken the smaller is the quantity necessary to effect the purpose. If, for example, seven or eight ounces taken in the morning, say with five ounces of hot water, produce one active movement of the bowels immediately after breakfast, the next morning six or seven ounces will do the same, and the morning after probably five or six ounces; and it is very likely that at the end of three weeks the patient will from four ounces experience the same effect produced originally by seven or eight. But after you have given it thus for one, two, or three weeks, according to the nature of the case and the results, you shall combine it with Carlsbad, say three or four ounces of the former and five or six of the latter, with three or four of hot water every morning. When Friedrichshalle is given alone, and also when it is mixed with Carlsbad, 20 or 30 per cent. of hot water should be added, that it may resemble somewhat the original condition at the spring. Friedrichshalle is naturally hot, and is evaporated on the spot to a small extent, being regulated and rendered uniform by stopping the process when the water reaches a certain specific gravity. Carlsbad, which at the spring is too hot to drink until cooled, should, when taken alone and unmixed, be raised in temperature to 90° to 100°, by placing the tumbler containing it in a vessel of hot water for a few minutes. After giving this combination of the two waters for two or three weeks, six, seven, or eight ounces of Carlsbad may be taken alone for another fortnight perhaps. The quantities given are considerably less than those administered at the spa itself, where a patient's stay is necessarily limited as to time. I am quite satisfied that the smaller quantity here recommended, and employed for six to nine weeks, instead of the usual three weeks of a foreign course, is better for the majority of the patients we have to deal with. The same quantity of water given there in twenty-one days, producing often notable loss of weight and power, will, if given here in fifty or sixty days, attain the object as certainly and more safely. I by no means dispute that there are other cases which may be benefited by the more heroic plan adopted on the spot. I have largely and systematically employed these agents now for seven or eight years, modifying the quantity and the mode as experience has indicated, and the course thus briefly described is the result of it. The course may be repeated with advantage, if necessary, for most patients after an interval of three or four months. Meantime, as an occasional aperient and a corrector of digestion for these patients, I know nothing at all equal to Friedrichshalle. It leaves the patient as a rule less constipated after discontinuing it than he was before, and, as already said, may be taken habitually without lowering the system. I have known patients continuing its daily use for three or four years, but I do not advise this course unless in exceptional cases. Nevertheless I know a gentleman, nearly eighty years old, who has taken it for five years regularly, a wine glass every morning, and the effect has been for him most admirable. Suffering much formerly from an obstinate constipation, he enjoys perfect regularity and excellent health. Let me say here that what is called "Carlsbad salt" is often used for the same purpose, and is taken also in the belief that it represents Carlsbad water. This it does not do, consisting almost entirely of sulphate of soda taken from the water, and has the same and no more virtue than that salt when obtained from any other source. No doubt that the sulphate of soda, known also as "Glauber's salt," is one of the most admirable medicines we possess, and deserves to be more popular than it is. I constantly order it, with or without a small addition of sulphate of magnesia, for the out-patients as the best substitute within my reach for the mineral waters in question.

In the few minutes which remain I will advert briefly to the subject of diet, certain restrictions in which are extremely important. It used to be said that when uric-acid is largely deposited, the nitrogenous elements of the food should be considerably diminished. I do not find in practice that a strict application of this rule is advantageous. On the contrary, the diminution of the deposit is more certainly attained by a course which is almost the opposite of that. There are three classes of aliments which must be permitted to the patient very sparingly, in order to attain the end in view—viz., alcohol, saccharine, and fatty matters. First, alcohol: any fermented liquor permitted as an article of diet, should be selected in its more diluted and in its most pure form. Believing that form in which it is found existing in natural wines to be usually the best, I would advise a light sound Bordeaux or a Rhine wine of similar quality, the former perhaps agreeing better with most persons here. You will forbid champagne, as for the most part imperfectly constituted, and always bad if containing much liqueur. The stronger wines, as sherry and port, are mostly unsuitable, and strong beer is to be absolutely forbidden. Solutions of pure spirit and water are exceptionally desirable for some few persons with weak digestion. Secondly, sugar in all its forms: at every meal and wherever met with, forbid it altogether. Thirdly, let fatty matters, butter, cream, and the fat of meat, whether simply cooked or in combination to form pastry, be taken very sparingly. I cannot enlarge on the theory on which this advice is given. Suffice it to say that abstinence from the substances named probably lightens considerably the work of the liver, and so lessens the vicarious labour of the kidneys in accordance with the views already propounded. Let me just advert, moreover, to the dietetic system at Carlsbad. In recognition of some such principle there, no doubt the use of sugar and of butter is absolutely forbidden during a Carlsbad course; and were you patients there, your purveyor would not supply you with the forbidden food, however much you might demand it. I can only say, as the result of observation, that this system much more than the elimination of meat from the dietary, will reduce the uric-acid deposit. If you will cut off a portion of alcoholic stimulant when necessary—and it often is so—will forbid everything that contains sugar, and diminish considerably all fatty matter—giving nitrogenous food, in fact, and eliminating hydrocarbons—you will generally accomplish more than by the contrary method. In addition to all this, you will of course see that the patient takes daily a fair amount of exercise in the open air, and that he protects his skin and encourages the performance of its functions by habitual ablutions and sufficient clothing. These points I can only name; but they are essential concomitants to the rest.

Well, then, it is this system of diet and regimen, and the occasional systematic employment of the mineral waters named, which mainly constitute the treatment I strongly advise for the purpose of checking calculous disease, in its early stages, and so to prevent the formation of stone in the bladder in that considerable majority of cases which are due to uric-acid formation and its consequences.

SPECIAL AGENTS (FOR THE UNITED KINGDOM),
FOR
FRIEDRICHSHALL WATER:
INGRAM & CO.,
119, QUEEN VICTORIA STREET, LONDON, E.C.

PRICE LIST

OF

NATURAL MINERAL WATERS

IMPORTED BY

INGRAM & CO.,

119, QUEEN VICTORIA STREET, LONDON, E.C.,

Special Agents (for the United Kingdom) for Friedrichshall Water, etc.

NAME.	COUNTRY.	Per Dozen.		Per Original Package.			
		Quarts.	Pints.	Bottles.	Quarts.	Bottles.	Pints.
Adelheidsquelle	Germany	16/	..	Fifty	64/	..	..
Apollinaris (glass)	Do.	8/	6/	Do.	27/	Hundred	43/
Do. (stone)	Do.	8/	6/	Do.	25/	Fifty	20/
Bareges	France	16/	12/	Do.	64/	Do.	48/
Birmenstorf	Do.	16/	..	Do.	64/	..	..
Bonnes	Do.	16/	12/	Do.	64/	Fifty	48/
Bussang	Do.	10/	..	Do.	38/	..	
Carlsbad	Bohemia	15/	..	Do.	55/	..	..
Controxeville	France	14/	..	Do.	54/	..	..
Ems	Germany	10/6	..	Do.	40/	..	..
Enghion	France	14/	..	Do.	54/	..	..
Fachingen	Germany	8/	6/	Do.	32/	Fifty	24/
Friedrichshall	Do.	16/	12/	Thirty	36/	Sixty	54/
Giesshubler	Bohemia	14/	10/	Twenty-five	28/	Fifty	40/
Harrogate	England	9/	..	3 Doz.	25/	..	..
Homburg	Germany	14/	..	Fifty	54/	..	..
Hunyadi-Janos	Hungary	24/	18/	Twenty-five	50/	Fifty	75/
Kissingen	Bavaria	16/	..	Fifty	60/	..	.
Kreuznach	Germany	14/	..	Thirty	34/	..	..
Marienbad	Bohemia	18/	..	Fifty	70/	..	..
Missisquoi	America	30/	..	..	..	..	..
Orezza	Corsica	14/	..	Thirty	34/	..	..
Plombieres	France	12/	..	Fifty	48/	..	..
Pougues	Do.	12/	..	Do.	48/	..	..
Pullna	Bohemia	18/	14/	Forty	55/	Forty	40/
Pyrmont	Germany	18/	..	Fifty	70/	..	..
Roisdorf	Do.	7/	..	Do.	25/	..	..
Saint Galmier	France	7/	..	Do.	25/	..	..
Saint Moritz	Switzerland	18/	..	Do.	70/	..	..
Schwalbach	Germany	12/	..	Do.	48/	..	..
Schwalheim	Do.	10/	..	Do.	40/	..	..
Seidlitz	Bohemia	..	12/	..	..	Fifty	45/
Seltzer	Germany	7/	5/	Fifty	26/	Do.	20/
Spa	Belgium	14/	..	Do.	54/	..	..
Vals	France	10/	..	Do.	38/	..	..
Vichy	Do.	10/	9/	Do.	38/	Fifty	32
Do. Saint Yorre	Do.	10/	..	Do.	36/	..	.
Weilbach	Germany	14/	..	Do.	54/	..	..
Wildungen	Do.	15/	..	Do.	55/	..	..

Carlsbad Salts.—¼-lb. Bottles, 3/; ½-lb. 5/; 1-lb. 9/ each.
Do. Soap.—½-lb. Tablets, 2/ each. **Pastilles**, 1/6 per box.
Kreuznach Salts.—1-lb. Bottles, 1/6 each; 7-lb. Jars, 7/6 each.
Marienbad Salts.—¼-lb. Bottles, 4/ each.
Orezza Pastilles, per Box, 1/6. **Granules**, 1/ per Bottle.
Vichy Salts.—*For Drinking*—Bottles or Boxes, 4/2 each.
Do. —*For Baths*—Rouleaux, 1/ each.
Do. Pastilles.—Large Boxes, 1/8 each; Small Boxes, 10d. each.

The above prices are "delivered in London," but the Waters may be obtained at corresponding prices of all respectable chemists in the country, at a slight advanc to cover cost of carriage.

As, in some instances, it may suit the convenience of members of the medica profession to order direct of INGRAM & Co., a discount of 10 per cent. will be allowe on such orders (except for Apollinaris, the terms for which are strictly *net cash*), in addition to the usual allowance of 2½ per cent. on orders *accompanied by a cas remittance* for the amount.

Cheques and Post-Office Orders to be crossed "FULLER & CO."

DISTORTED

SOME TIGHT
GUTTERS